Appendix A
Additional Information About the NIPA Estimates

Statistical Conventions

Changes in current-dollar GDP measure changes in the market value of goods and services produced in the economy in a particular period. For many purposes, it is necessary to decompose these changes into quantity and price components. To compute the quantity indexes, changes in the quantities of individual goods and services are weighted by their prices. (Quantity changes for GDP are often referred to as changes in "real GDP.") For the price indexes, changes in the prices for individual goods and services are weighted by quantities produced. (In practice, the current-dollar value and price indexes for most GDP components are determined largely using data from Federal Government surveys, and the real values of these components are calculated by deflation at the most detailed level for which all the required data are available.)

The annual changes in quantities and prices are calculated using a Fisher formula that incorporates weights from 2 adjacent years. For example, the 1997–98 annual percent change in real GDP uses prices for 1997 and 1998 as weights, and the 1997–98 annual percent change in the GDP price index uses quantities for 1997 and 1998 as weights. Because the Fisher formula allows for the effects of changes in relative prices and in the composition of output over time, the resulting quantity or price changes are not affected by the substitution bias that is associated with changes in quantities and prices calculated using a fixed-weighted formula.[1] These annual changes are "chained" (multiplied) together to form time series of quantity and price; the percent changes that are calculated from these time series are not affected by the choice of reference period.

The quarterly changes in quantities and prices are calculated with weights from two adjacent quarters. As part of an annual or comprehensive revision, the quarterly indexes through the most recent complete year are adjusted to ensure that the average of the quarterly indexes conforms to the corresponding annual index.

In addition, BEA prepares measures of real GDP and its components in a dollar-denominated form, designated "*chained (1996) dollar estimates.*" These estimates are computed by multiplying the 1996 current-dollar value of GDP, or of a GDP component, by the corresponding quantity index number. For example, if a current-dollar GDP component equaled $100 in 1996 and if real output for this component increased by 10 percent in 1997, then the "chained (1996) dollar" value of this component in 1997 would be $110 ($100 × 1.10). Note that percentage changes in the chained (1996) dollar estimates and the percentage changes calculated from the quantity indexes are identical, except for small differences due to rounding.

Because of the formula used for calculating real GDP, the chained (1996) dollar estimates for detailed GDP components *do not add* to the chained-dollar value of GDP or to any intermediate aggregates. A "*residual*" line is shown as the difference between GDP and the sum of the most detailed components shown in each table. The residual generally is small close to the base period but tends to become larger as one moves further from it. Accurate measures of component contributions to the percentage changes in real GDP and its major components are shown in NIPA tables 8.2–8.6.

BEA also publishes the "implicit price deflator" (IPD), which is calculated as the ratio of current-dollar value to the corresponding chained-dollar value, multiplied by 100; the values of the IPD and of the corresponding "chain-type" price index are very close.

For quarters and months, the estimates are presented at annual rates, which show the value that would be registered if the rate of activity measured for a quarter or a month were maintained for a full year. Annual rates are used so that time periods of different lengths—for example, quarters and years—may be compared easily. These annual rates are determined simply by multiplying the estimated rate of activity by 4 (for quarterly data) or 12 (for monthly data).

Percent changes in the estimates are also expressed at annual rates. Calculating these *changes* requires a variant of the compound interest formula:

$$r = \left[\left(\frac{X_t}{X_o} \right)^{m/n} - 1 \right] \times 100,$$

where r is the percent change at an annual rate;
X_t is the level of activity in the later period;
X_o is the level of activity in the earlier period;
m is the yearly periodicity of the data (for example, 1 for annual data, 4 for quarterly, or 12 for monthly); and
n is the number of periods between the earlier and later periods (that is, $t - o$).

Quarterly and monthly NIPA estimates are seasonally adjusted, if necessary. Seasonal adjustment removes from the time series the average impact of variations that normally occur at about the same time and in about the same magnitude each year—for example, weather, holidays, and tax payment dates. After seasonal adjustment, cyclical and other short-term changes in the economy stand out more clearly.

1. In addition, because the changes in quantities and prices calculated using these weights are symmetric, the product of a quantity index and the corresponding price index is generally equal to the current-dollar index.

Reconciliation Tables

Table 1.—Reconciliation of Changes in BEA-Derived Compensation Per Hour with BLS Average Hourly Earnings

[Percent change from perceding period]

	1997	1998	Seasonally adjusted at annual rates					
			1998			1999		
			II	III	IV	I	II	III
BEA-derived compensation per hour of all persons in the nonfarm business sector (less housing) [1]	**3.6**	**5.2**	**5.6**	**6.2**	**4.6**	**4.2**	**4.8**	**5.4**
Less: Contribution of supplements to wages and salaries per hour	–.5	–.5	–.6	–.5	–.5	0	–.2	–.3
Plus: Contribution of wages and salaries per hour of persons in housing and in nonprofit institutions	–.1	–.3	–.1	–.3	–.1	–.1	–.1	–.3
Less: Contribution of wages and salaries per hour of persons in government enterprises, unpaid family workers, and self-employed	–.1	–.2	–.1	–.1	–.1	–.3	.1	.5
***Equals*: BEA-derived wages and salaries per hour of all employees in the private nonfarm sector**	**4.0**	**5.6**	**6.1**	**6.4**	**5.0**	**4.3**	**4.7**	**4.9**
Less: Contribution of wages and salaries per hour of nonproduction workers in manufacturing	.1	–.1	.7	.4	.4	.4	.4	.4
Less: Other differences [2]	0	1.6	1.1	2.3	1.5	0	.7	.8
***Equals*: BLS average hourly earnings of production or nonsupervisory workers on private nonfarm payrolls**	**3.9**	**4.1**	**4.3**	**3.7**	**3.2**	**4.0**	**3.6**	**3.7**
Addendum:								
BLS estimates of compensation per hour in the nonfarm business sector [3]	3.6	5.2	5.6	6.2	4.6	4.2	4.8	4.7

[P] Preliminary.

1. Includes BLS data on compensation and hours of nonfarm proprietors and hours worked of unpaid family workers.

2. Includes BEA use of non-BLS data and differences in detailed weighting. Annual estimates also include differences in BEA and BLS benchmark procedures; quarterly estimates also include differences in seasonal adjustment procedures.

3. These estimates differ from the BEA-derived estimates (first line) because the BLS estimates include compensation and hours of tenant-occupied housing.

BLS Bureau of Labor Statistics

Table 2.—Relation of Net Exports of Goods and Services and Net Receipts of Income in the NIPA's to Balance on Goods, Services, and Income in the ITA's

[Billions of dollars]

	Line	1997	1998	Seasonally adjusted at annual rates					
				1998			1999		
				II	III	IV	I	II	III
Exports of goods, services, and income receipts, ITA's	**1**	**1,197.2**	**1,192.2**	**1,193.9**	**1,166.0**	**1,199.9**	**1,183.7**	**1,205.5**	**1,248.8**
Less: Gold, ITA's	2	5.7	5.5	4.4	5.2	7.1	2.9	3.3	6.0
Statistical differences [1]	3	0	0	0	0	0	0	–1.1	–2.6
Other items	4	.8	.8	.6	.8	1.2	.8	.9	.9
Plus: Adjustment for grossing of parent/affiliate interest payments	5	4.5	5.0	4.9	5.2	5.7	4.3	4.4	4.6
Adjustment for U.S. territories and Puerto Rico	6	38.1	42.3	40.9	41.4	46.4	47.2	48.1	47.3
Services furnished without payment by financial intermediaries except life insurance carriers	7	17.3	18.5	18.4	18.8	18.9	19.2	19.4	19.9
***Equals*: Exports of goods and services and income receipts, NIPA's**	**8**	**1,250.6**	**1,251.6**	**1,253.0**	**1,225.5**	**1,262.7**	**1,250.7**	**1,274.3**	**1,316.2**
Imports of goods, services, and income payments, ITA's	**9**	**1,298.7**	**1,368.7**	**1,363.9**	**1,376.7**	**1,392.7**	**1,417.0**	**1,484.3**	**1,563.7**
Less: Gold, ITA's	10	6.6	6.5	5.5	7.3	6.6	3.2	3.2	7.6
Statistical differences [1]	11	0	0	0	0	0	0	.9	.8
Other items	12	0	0	0	0	0	0	0	0
Plus: Gold, NIPA's	13	–3.6	–3.1	–3.1	–2.9	–2.9	–2.3	–2.4	–2.5
Adjustment for grossing of parent/affiliate interest payments	14	4.5	5.0	4.9	5.2	5.7	4.3	4.4	4.6
Adjustment for U.S. territories and Puerto Rico	15	24.3	28.5	28.3	26.2	33.1	31.7	32.8	32.3
Imputed interest paid to rest of world	16	17.3	18.5	18.4	18.8	18.9	19.2	19.4	19.9
***Equals*: Imports of goods and services and income payments, NIPA's**	**17**	**1,334.7**	**1,411.1**	**1,407.0**	**1,416.8**	**1,441.0**	**1,466.7**	**1,534.4**	**1,609.8**
Balance on goods, services, and income, ITA's (1–9)	**18**	**–101.5**	**–176.5**	**–170.0**	**–210.7**	**–192.8**	**–233.3**	**–278.8**	**–314.9**
Less: Gold (2–10+13)	19	–4.5	–4.1	–4.2	–5.0	–2.4	–2.6	–2.3	–4.1
Statistical differences (3–11) [1]	20	0	0	0	0	0	0	–2.0	–3.4
Other items (4–12)	21	.8	.8	.6	.8	1.2	.8	.9	.9
Plus: Adjustment for U.S. territories and Puerto Rico (6–15)	22	13.8	13.8	12.6	15.2	13.3	15.5	15.3	15.0
***Equals*: Net exports of goods and services and net receipts of income, NIPA's (8–17)**	**23**	**–84.1**	**–159.5**	**–154.0**	**–191.3**	**–178.3**	**–216.0**	**–260.1**	**–293.6**

1. Consists of statistical revisions in the NIPA's that have not yet been incorporated into the ITA's (1999:III) and statistical revisions in the ITA's that have not yet been incorporated into the NIPA's (1999:II-1999:III).

ITA's International transactions accounts

NIPA's National income and product accounts

Appendix B
Suggested Reading

BEA's Mission and Strategic Plan

BEA's mission statement and the latest update to BEA's strategic plan for improving the accuracy, reliability, and relevance of the national, regional, and international accounts are available on BEA's Web site (see the box below). The initial development and implementation of the strategic plan is described in the following articles in the SURVEY OF CURRENT BUSINESS.

"Mid-Decade Strategic Review of BEA's Economic Accounts: Maintaining and Improving Their Performance" (February 1995)

"Mid-Decade Strategic Review of BEA's Economic Accounts: An Update" (April 1995)

"BEA's Mid-Decade Strategic Plan: A Progress Report" (June 1996)

Methodology

BEA has published a wealth of information about the methodology used to prepare its national, regional, and international estimates.

National

National income and product accounts (NIPA's)

NIPA Methodology Papers: This series documents the conceptual framework of the NIPA's and the methodology used to prepare the estimates.

An Introduction to National Economic Accounting (NIPA Methodology Paper No. 1, 1985) [Also appeared in the March 1985 issue of the SURVEY]

Corporate Profits: Profits Before Tax, Profits Tax Liability, and Dividends (NIPA Methodology Paper No. 2, 1985)

Foreign Transactions (NIPA Methodology Paper No. 3, 1987) [Revised version forthcoming]

GNP: An Overview of Source Data and Estimating Methods (NIPA Methodology Paper No. 4, 1987) [Largely superseded by "A Guide to the NIPA's" (March 1998 SURVEY)]

Government Transactions (NIPA Methodology Paper No. 5, 1988)

Personal Consumption Expenditures (NIPA Methodology Paper No. 6, 1990)

The methodologies described in these papers are subject to periodic improvements that are typically introduced as part of the annual and comprehensive revisions of the NIPA's; these improvements are described in the SURVEY articles that cover these revisions.

The most recent comprehensive revision of the NIPA's is described in the following series of SURVEY articles.

"A Preview of the 1999 Comprehensive Revision of the National Income and Product Accounts":

"Definitional and Classificational Changes" (August 1999)

"New and Redesigned Tables" (September 1999)

"Statistical Changes" (October 1999)

"Improved Estimates of the National Income and Product Accounts for 1959–98: Results of the Comprehensive Revision" (December 1999)

"Annual Revision of the U.S. National Income and Product Accounts": This series of SURVEY articles, the latest of which was published in the August 1998 issue, describes the annual NIPA revisions and the improvements in methodology.

"A Guide to the NIPA's" (March 1998 SURVEY) provides the definitions of the major NIPA aggregates and components; discusses the measures of real output and prices; explains how production is classified and how the NIPA's are presented; describes the statistical conventions that are used; and lists the principal source data and methods used to prepare the estimates of gross domestic product (GDP).

Information on the sources and methods used to prepare the national estimates of personal income, which provide the basis for the State estimates of personal income, can be found in *State Personal Income, 1929–97* (1999).

"BEA's Chain Indexes, Time Series, and Measures of Long-Term Economic Growth" (May 1997) is the most recent in a series of SURVEY articles that describe the conceptual basis for the chain-type measures of real output and prices used in the NIPA's.

"Reliability of the Quarterly and Annual Estimates of GDP and Gross Domestic Income" (December 1998

Availability

Most of the items listed here are available on BEA's Web site at <www.bea.doc.gov>. In addition, see the *BEA Catalog of Products* for the availability of printed publications. The *Catalog* is available on BEA's Web site; a printed copy can be obtained by writing to the Public Information Office, BE–53, Bureau of Economic Analysis, U.S. Department of Commerce, Washington, DC 20230, or by calling 202–606–9900.

SURVEY) evaluates the reliability of these estimates by examining the record of revisions to them.

Wealth and related estimates

Fixed Reproducible Tangible Wealth in the United States, 1929–94 (1999) discusses the conceptual and statistical considerations underlying the BEA wealth estimates and explains the derivation of the estimates.

Gross product by industry

"Improved Estimates of Gross Product by Industry, 1959–94" (August 1996 SURVEY) describes the most recent comprehensive revision of the estimates of gross product by industry.

"Gross Product by Industry, 1947–96" (November 1997 SURVEY) and "Gross Product by Industry, 1995–97" (November 1998 SURVEY) present the most recent revisions to the estimates of gross product by industry and briefly describe changes in methodology.

Input-output accounts

"Benchmark Input-Output Accounts for the U.S. Economy, 1992" (November 1997 SURVEY) describes the preparation of the 1992 input-output (I-O) accounts and the concepts and methods underlying the U.S. I-O accounts.

"Annual Input-Output Accounts of the U.S. Economy, 1996" (January 2000 SURVEY) presents annual I-O tables for 1996 that update the 1992 benchmark I-O accounts.

Satellite accounts

Satellite accounts that extend the analytical capacity of the national accounts by focusing on a particular aspect of activity are presented in the following SURVEY articles.

"Integrated Economic and Environmental Satellite Accounts" and "Accounting for Mineral Resources: Issues and BEA's Initial Estimates" (April 1994)

"A Satellite Account for Research and Development" (November 1994)

"U.S. Transportation Satellite Accounts for 1992" (April 1998)

"U.S. Travel and Tourism Satellite Accounts for 1992" (July 1998)

International

International transactions accounts (ITA's)

The Balance of Payments of the United States: Concepts, Data Sources, and Estimating Procedures (1990) describes the methodologies used in preparing the estimates in the ITA's and of the international investment position of the United States. These methodologies are subject to periodic improvements that are typically introduced as part of the annual revisions of the ITA's.

"U.S. International Transactions, Revised Estimates": This series of SURVEY articles, the latest of which was published in the July 1999 issue, describes the annual ITA revisions and the improvements in methodology.

Direct investment

International Direct Investment: Studies by the Bureau of Economic Analysis (1999) presents a collection of previously published studies on U.S. direct investment abroad and foreign direct investment in the United States. In addition, it includes the following guides to BEA's statistics and methodologies used to prepare the estimates.

"Methodology for U.S. Direct Investment Abroad" (*U.S. Direct Investment Abroad: 1994 Benchmark Survey, Final Results* (1998))

"A Guide to BEA Statistics on U.S. Multinational Companies" (March 1995 SURVEY)

"Methodology for Foreign Direct Investment in the United States" (*Foreign Direct Investment in the United States: 1992 Benchmark Survey, Final Results* (1995))

"A Guide to BEA Statistics on Foreign Direct Investment in the United States" (February 1990 SURVEY)

Surveys of international services

U.S. International Transactions in Private Services: A Guide to the Surveys Conducted by the Bureau of Economic Analysis (1998) provides information on the 11 surveys that BEA conducts on these transactions—including classifications, definitions, release schedules, and methods used to prepare the estimates—and samples of the survey forms.

Regional

Personal income

State Personal Income, 1929–97 (1999) includes a description of the methodology used to prepare the estimates of State personal income. [Also available on the CD-ROM *State Personal Income, 1929–97*]

Local Area Personal Income, 1969–92 (1994) includes a description of the methodology used to prepare the estimates of local area personal income. [Also available on the CD-ROM *Regional Economic Information System, 1969–97*]

Gross state product

"Comprehensive Revision of Gross State Product by Industry, 1977–94" (June 1997 SURVEY) summarizes the sources and methods for BEA's estimates of gross state product.

"Gross State Product by Industry, 1977–96" (June 1998 SURVEY) and "Gross State Product by Industry, 1995–97" (June 1999 SURVEY) present the most recent revisions to the estimates of gross state product by industry and briefly describe changes in methodology.